

FT-2900R Alignment

Introduction

The FT-2900R is carefully aligned at the factory for the specified performance across the amateur band. Realignment should therefore not be necessary except in the event of a component failure. Only an authorized Vertex Standard representative should perform all component replacement and service, or the warranty policy may be void.

The following procedures cover the adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts subsequently are replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

We recommend that servicing be performed only by authorized Vertex Standard service technicians who are experienced with the circuitry and fully equipped for repair and alignment. If a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Vertex Standard service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components.

Those who do undertake any of the following alignments are cautioned to proceed at their own risk. Problems caused by unauthorized attempts at realignment are not covered by the warranty policy. Also, Vertex Standard reserves the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners.

Under no circumstances should any alignment be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and realignment determined to be absolutely necessary.

Required Test Equipment

The following test equipment (and familiarity with its use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy. While most steps do not require all of the equipment listed, the interactions of some adjustments may require that more complex adjustments be performed afterwards.

Do not attempt to perform only a single step unless it is clearly isolated electrically from all other steps. Have all test equipment ready before beginning and, follow all of

the steps in a section in the order presented.

- RF Signal Generator with calibrated output level at 200 MHz
- Deviation Meter (linear detector)
- In-line Wattmeter with 5% accuracy at 200 MHz
- 50-Ohm 100-W RF Dummy Load
- 8-Ohm AF Dummy Load
- Regulated DC Power Supply adjustable from 6 to 15 VDC, 20A
- Frequency Counter: 0.2-ppm accuracy at 200 MHz
- AF Signal Generator
- AC Voltmeter
- DC Voltmeter: high impedance
- VHF Sampling Coupler
- SINAD Meter

Alignment Preparation & Precautions

A 50-Ohm RF load and in-line wattmeter must be connected to the antenna jack in all procedures that call for transmission; alignment is not possible with an antenna. After completing one step, read the next step to see if the same test equipment is required. If not, remove the test equipment (except dummy load and wattmeter, if connected) before proceeding.

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 68 °F ~ 86 °F (20 °C ~ 30 °C). When the transceiver is brought into the shop from hot or cold air, it should be allowed some time to come to room temperature before alignment. Whenever possible, alignments should be made with oscillator shields and circuit boards firmly affixed in place. Also, the test equipment must be thoroughly warmed up before beginning.

Note: Signal levels in dB referred to in the alignment procedure are based on 0dB μ = 0.5 μ V.

Test Setup

Set up the test equipment as shown below for transceiver alignment.

Entering the Alignment Mode

Alignment of the FT-2900R is performed using a front panel software-based procedure.

To perform alignment of the transceiver, it must first be placed in the “Alignment Mode,” in which the adjustments will be made and then stored into memory.

To enter the Alignment mode, press and hold in the [REV(DW)] and [D/MR(MW)] keys while turning the radio on. Once the radio is on, release these two key. The transceiver is now in the “Alignment Mode.”

PLL Reference Frequency

- Rotate the DIAL knob to set the alignment parameter to “146.000 rF.”
- Press the [D/MR(MW)] key to enable adjustment of the “PLL Reference Frequency.”
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the counter frequency reading is 146.000 MHz (± 100 Hz).
- Press the [D/MR(MW)] key.

RF Front-end Tuning

- Inject a 145.100 MHz signal at a level of -10 dB μ (with 1 kHz modulation @ ± 3.5 kHz deviation) from the RF signal generator.
- Rotate the DIAL knob to set the alignment parameter to “145.100 tn.”
- Press the [D/MR(MW)] key to enable adjustment of the “RF Front-end Tuning.”
- Adjust the DIAL knob so that the maximum SINAD.
- Press the [D/MR(MW)] key.

Squelch Threshold Level

- Inject a 145.100 MHz signal at a level of -14 dB μ (with 1 kHz modulation @ ± 3.5 kHz deviation) from the RF signal generator.
- Rotate the SQL knob to the 10-o’clock position.
- Rotate the DIAL knob to set the alignment parameter to “145.100 tL.”
- Press the [D/MR(MW)] key to enable adjustment of the “Squelch Threshold Level.”
- Press the [D/MR(MW)] key three times.
- Press the [D/MR(MW)] key.

S-meter Level (S-1)

- Inject a 145.100 MHz signal at a level of -5 dB μ (with 1 kHz modulation @ ± 3.5 kHz deviation) from the RF signal generator.
- Rotate the DIAL knob to set the alignment parameter to “145.100 S1.”
- Press the [D/MR(MW)] key to enable adjustment of the “S-meter Level (S-1).”

- Press the [D/MR(MW)] key three times.
- Press the [D/MR(MW)] key.

S-meter Level (S-9)

- Inject a 145.100 MHz signal at a level of +23 dB μ (with 1 kHz modulation @ \pm 3.5 kHz deviation) from the RF signal generator.
- Rotate the DIAL knob to set the alignment parameter to “145.100 S9.”
- Press the [D/MR(MW)] key to enable adjustment of the “S-meter Level (S-9).”
- Press the [D/MR(MW)] key three times.
- Press the [D/MR(MW)] key.

TX Power (High)

- Rotate the DIAL knob to set the alignment parameter to “145.000 HP.”
- Press the [D/MR(MW)] key to enable adjustment of the “TX Power (High).”
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the RF Power Meter reading is 75 W (\pm 3.0W).
- Press the [D/MR(MW)] key.

TX Power (Low 3)

- Rotate the DIAL knob to set the alignment parameter to “145.000 L3.”
- Press the [D/MR(MW)] key to enable adjustment of the “TX Power (Low 3).”
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the RF Power Meter reading is 30 W (\pm 1.5 W).
- Press the [D/MR(MW)] key.

TX Power (Low 2)

- Rotate the DIAL knob to set the alignment parameter to “145.000 L2.”
- Press the [D/MR(MW)] key to enable adjustment of the “TX Power (Low 2).”
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the RF Power Meter reading is 10 W (\pm 1.0 W).
- Press the [D/MR(MW)] key.

TX Power (Low 1)

- Rotate the DIAL knob to set the alignment parameter to “145.000 L1.”
- Press the [D/MR(MW)] key to enable adjustment of the “TX Power (Low 1).”
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the

RF Power Meter reading is 5 W (± 0.5 W).

- Press the [D/MR(MW)] key.

TX Deviation

- Inject a 1 kHz, 50 mV signal from the Audio Generator.
- Rotate the DIAL knob to set the alignment parameter to "145.000 dU."
- Press the [D/MR(MW)] key to enable adjustment of the "TX Deviation."
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the Deviation Meter reading is 4.2 kHz (± 0.1 kHz).
- Press the [D/MR(MW)] key.

CTCSS TX Deviation

- Rotate the DIAL knob to set the alignment parameter to "145.000 100."
- Press the [D/MR(MW)] key to enable adjustment of the "CTCSS TX Deviation."
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the Deviation Meter reading is 0.6 kHz (± 0.05 kHz).
- Press the [D/MR(MW)] key.

DCS TX Deviation

- Rotate the DIAL knob to set the alignment parameter to "145.000 dC."
- Press the [D/MR(MW)] key to enable adjustment of the "DCS TX Deviation."
- Press the PTT switch to activate the transmitter, adjust the DIAL knob so that the Deviation Meter reading is 0.8 kHz (± 0.05 kHz).
- Press the [D/MR(MW)] key.

Closing the Alignment mode

Press the [DW(REV)] key to save the new setting and exit to normal operation.